Publication List

Rolf Walder

I. Refereed Papers and Invited Reviews

The different progenitors of type Ib, Ic SNe and of GRB, with D. Folini, C. Georgy, A. Maeder, and G. Meynet. *Astronomy and Astrophysics*, 502, 611-622, 2009.

3D simulations of RS Oph: from accretion to nova blast, with D. Folini, and S.N. Shore. *Astronomy and Astrophysics Letters*, 484, L9–L12, 2008.

Fundamental differences between SPH and grid methods, with O. Agertz, B. Moore, J. Stadel, D. Potter, F. Miniati, J. Read, L. Mayer, A. Gawryszczak, A. Kravtsov, Å. Nordlund, F. Pearce, V. Quilis, D. Rudd, V. Springel, J. Stone, E. Tasker, R. Teyssier, and J. Wadsley. *Monthly Notices of the Royal Astronomical Society*, 380, 963–378, 2007.

Supersonic turbulence in shock-bound interaction zones I: symmetric settings, with Doris Folini. *Astronomy and Astrophysics*, 459, 1–19, 2006.

Aspects of turbulence in astrophysics, with Doris Folini and Jean M. Favre. *Ercoftac Bulletin*, 70, 2006. Invited contribution to the special issue on compressible turbulence of the European Research Community of Flows, Turbulence, and Combustion (ERCOFTAC).

The Spin Periods and Rotational Profiles of Neutron Stars at Birth with C.D. Ott, A. Burrows, T.A. Thompson, and E. Livne. *The Astrophysical Journal, Supplement Series*, 164, 130–155, 2006.

Anisotropies in the Neutrino Fluxes and Heating Profiles in Two-dimensional, Time-dependent, Multi-group Radiation Hydrodynamics Simulations of Rotating Core-Collapse Supernovae, with E. Livne, A. Burrows, C.D. Ott, and M. Jarrah. *The Astrophysical Journal*, 626, 317–332, 2005.

Supernovae, Rotation, and Bipolar Explosion with , A. Burrows, C.D. Ott, and E. Livne *Nuclear Physics A*, 752, 570–579, 2005.

NRAO VLA Observations of ζ Aurigae: Confirmations of the Slow Acceleration Wind Density Structure, with G.M. Harper, A. Brown, P.D. Bennett, R. Baade, and C.A. Hummel. *The Astronomical Journal* 129:1018–1034, 2005.

Two-dimensional, Time-dependent, Multi-group, Multi-angle Radiation Hydrodynamics Test Simulation in the Core-Collapse Supernova Context with E. Livne, A. Burrows, I. Lichtenstadt, and T. Thompson. *The Astrophysical Journal*, 609:277–287, 2004.

Structuring and support of molecular clouds by Alfvén waves with D. Folini and J. Heyvaerts. *Astronomy and Astrophysics* 414:559–572, 2004.

Gravitational waves from axisymmetric, rotating stellar core collapse, with C.D. Ott, A. Burrows, and E. Livne. *The Astrophysical Journal*, 600:834–864, 2004.

3D-hydrodynamics of colliding winds in massive binaries, with D. Folini. In K.A. van der Hucht, A. Herrero, and C. Esteban (eds.), *A Massive Star Odyssey: from Main Sequence to Supernova*, Proc. IAU Symp. No. 212 (San Francisco: ASP), 139–147, 2003.

Theoretical consideration of colliding clumped winds, with D. Folini. In T. Moffat and N. St-Louis (eds.), *Interacting Winds from Massive Stars*, ASP Conference Series 260, 595–603, 2002.

Complex wind dynamics and ionization structure in symbiotic binaries, with D. Folini. In H. J.G.L.M. Lamers and A. Sapar (eds.), *Thermal and Ionization Aspects of Flows from Hot Stars*, ASP Conference Series 204, 331–342, 2000.

On the stability of colliding flows: radiative shocks, thin shells, and supersonic turbulence, with D. Folini. *Astrophysics and Space Science*, 274/1-2:343–352, 2000.

A wind accretion wake in RW Hydrae?, with T. Dumm, D. Folini, H. Nussbaumer, H. Schild, and W. Schmutz. *Astronomy and Astrophysics*, 354:1014–1020, 2000.

Theory of thermal and ionization effects in colliding winds of WR+O binaries, with D. Folini. In H. J.G.L.M. Lamers and A. Sapar (eds.), *Thermal and Ionization Aspects of Flows from Hot Stars*, ASP Conference Series 204, 267–278, 2000.

3D hydrodynamical simulations of colliding wind binaries: theory confronts observations, with D. Folini. *Astrophysics and Space Science*, 274/1-2:189–194, 2000.

Colliding winds in WR binaries: further developments within a complicated story, with D. Folini and S. Motamen. In K.A. van der Hucht, G. Koenigsberger, and P.R.J. Eenens (eds.), *Wolf-Rayet Phenomena in Massive Stars and Starburst Galaxies, Proc. IAU Symposium No. 193*, 298–305, 1999.

Colliding winds in binary star systems. *Astrophysics and Space Science*, 260:243–252, 1999.

The formation of knots and filaments in shocks, with D. Folini. *Astrophysics and Space Science*, 260:215–224, 1999.

Radiative shocks, supersonic turbulence and structure formation in space, with D. Folini. In M. Fey and R. Jeltsch (eds.), *Hyperbolic Problems: Theory, Numerics, Applications. 7^{th} International Conference in Zürich*, number 130 in the International Series of Numerical Mathematics, 973–982. Birkhäuser, 1999.

3D radiative transfer under conditions of non local thermodynamic equilibrium: A contribution to the numerical solution, with D. Folini. In M. Fey and R. Jeltsch (eds.), *Hyperbolic Problems: Theory, Numerics, Applications. 7^{th} International Conference in Zürich*, number 129 in the International Series of Numerical Mathematics, 305–314. Birkhäuser, 1999.

Knots, filaments, and turbulence in radiative shocks, with D. Folini. *Astronomy and Astrophysics*, 330:L21–L24, 1998.

3D simulations of colliding hypersonic radiative flows in astrophysics. In J. Glimm, M. J. Graham, J. W. Grove, and B. J. Plohr (eds.), *Hyperbolic Problems: Theory, Numerics, Applications. 5^{th} International Conference in Stony Brook*, 478–484, 1996.

Structure and stability of radiative shock waves, with D. Folini. In J. Glimm, M. J. Graham, J. W. Grove, and B. J. Plohr (eds.), *Hyperbolic Problems: Theory, Numerics, Applications. 5^{th} International Conference in Stony Brook*, 313–319, 1996.

Radiative cooling instability in 1D colliding flows, with D. Folini. *Astronomy and Astrophysics*, 315:265–284, 1996.

The ROSAT spectrum of the symbiotic nova AG Pegasi: Evidence for colliding winds, with U. Mürset and S. Jordan. *Astronomy and Astrophysics*, 297:L87–90, 1995.

Mass accretion onto compact objects in 2D, with A. Zarinelli and H. Nussbaumer. *Astronomy and Astrophysics*, 301:922–928, 1995.

Simulations of colliding winds in 3 dimensions, In K.A. van der Hucht and P.M. Williams (eds.), *WR Stars: Binaries, Colliding Winds, Evolution*, *IAU Symposium No. 163*, 420–424, 1995.

Modification of the nebular environment in symbiotic systems due to colliding winds, with H. Nussbaumer. *Astronomy and Astrophysics*, 278:209–225, 1993.

Stability analysis of colliding winds in double star systems, with R. Dgani and H. Nussbaumer. *Astronomy and Astrophysics*, 267:155–160, 1993.

PhD-thesis and diploma-thesis

Some aspects of the computational dynamics of colliding flows in astrophysical nebulae. PhD thesis, ETH Zürich No 10302, 1994.

Röntgenhintergrundstrahlung und die Frage eines heissen intergalaktischen Plasmas, *Diplomathesis under the supervision of Prof. N. Straumann, University of Zürich*, 1988.

II. The A-MAZE code package, with Doris Folini and many collaborators, 1999.

The package, comprising 200'000 statements of code, contains

- a 3D adaptive mesh code for Newtonian and special-relativistic magnetic flows (MHD)
- a 3D adaptive mesh, optically thick, radiative transfer code for moving media which are not in the thermodynamical equilibrium (NLTE)
- a 3D adaptive NLTE radiative transfer code for moving media under nebular conditions
- radiation-hydrodynamical codes, combining the two approaches
- Scripts controlling simulations, data-handling and archiving
- Codes to analyze large numerical data and to extract observable features from simulations
- Parallel high-end graphics for 3D multi-block adaptive grid data
- Code description and user manual
- Exercises and computational examples

III. Contributed conference papers

Implicit hydrodynamic simulations of stellar interiors, with M. Viallet, I. Baraffe, C. Mulet-Marquis, E. Leveque, B. Freytag, C. Winisdoerffer. In: ASTRONUM-2009: Numerical Modeling of Space Plasma Flows, 2010.

Recurrent Novae: Progenitors of SN Ia?, with D. Folini, J. Favre, and S. Shore. In: ASTRONUM-2009: Numerical Modeling of Space Plasma Flows, 2010.

Supersonically Turbulent, Shock Bound Interaction Zones, with D. Folini and J. Favre In: ASTRONUM-2009: Numerical Modeling of Space Plasma Flows, 2010.

Models of stars rotating near the critical limit with G. Meynet, C. Georgy, and Y. Revaz. In: The interferometric view on Hot stars Revista Mexicana de Astronomía y Astrofísica 38, 113-116 2010.

Supersonic turbulence as an agent of structure formation in space, with D. Folini, R. LeVeque, and J. Favre. PAMM, Proc. Appl. Math. Mech. 7, 1141801, 2007.

Analysis of nanometer particles in aqueous solutions by Laser Induced Breakdown Detection (LIBD) C. Latkoczy, R. Kägi, T. Wagner, B. Hetzer, M. Boller, and D. Günther. EMSLIBS Proceedings, 2007.

Rotating Core Collapse and Bipolar Supernova Explosions, with A Burrows, C. D. Ott, and E Livne. In Roberta Humphreys (ed.), the proceedings of the international conference *The Fate of the Most Massive Stars*, May 23–28, 2004, at Jackson Lake Lodge, Grand Teton National Park, USA, (ASP Conf. Series).

A new method for 3D radiative transfer with adaptive grids, with D. Folini, M. Psarros, and A. Desboeufs. In I. Hubeny, D. Mihalas, and K. Werner (eds.), *Proceedings of the Workshop Stellar Atmosphere Modeling*, ASP Conference Series, 288, 433–436, 2003.

VLA Observations of ζ Aurigae: testing UV-diagnostics, with G. Harper, A. Brown, P. Benett, R. Baade, D. Reimers, and C. Hummel. *AAS-Meeting*, January 2002.

Theoretical predictions for the cold part of the colliding wind interaction zone, with D. Folini. In T. Moffat and N. St-Louis (eds.), *Interacting Winds from Massive Stars*, ASP Conf. Series., 260, 605–614, 2002.

A-MAZE: A code package to compute 3D magnetic flows, 3D NLTE radiative transfer, and synthetic spectra, with D. Folini. In H. J.G.L.M. Lamers and A. Sapar (eds.), *Thermal and Ionization Aspects of Flows from Hot Stars*, ASP Conference Series 204, 281–284, 2000.

Heat conduction and colliding winds in WR binaries, with S. M. Motamen and D. Folini. In K.A. van der Hucht, G. Koenigsberger, and P.R.J. Eenens (eds.), *Wolf-Rayet Phenomena in Massive Stars and Starburst Galaxies, Proc. IAU Symposium No. 193*, 378–379, 1999.

3D NLTE radiative transfer: A new code and its application to γ-Vel, with D. Folini. In K.A. van der Hucht, G. Koenigsberger, and P.R.J. Eenens (eds.), *Wolf-Rayet Phenomena in Massive Stars and Starburst Galaxies, Proc. IAU Symposium No. 193*, 352–353, 1999.

HST NICMOS observations of circumstellar matter around Cyg X-3, with W. Schmutz, W. Vacca, L. Close, J. Rayner, T. Geballe, and H. Schild. In W. Freudling and R. Hook (eds.), *NICMOS and the VLT*, number 55 in ESO conference and workshop proceedings, 123–132, 1998.

Accretion and colliding winds in separated binaries. $Herbsttagung\ der\ Deutschen\ Astronomischen\ Gesellschaft$, Heidelberg, Germany, September 16, 1998.

Visualization of astrophysical data with AVS/Express, with J. Favre and D. Folini. In *40^{th} Cray User Group Conference*, Stuttgart, Germany, June 15-19, 1998.

Radiative shocks and structure formation in space, with D. Folini. *Helv. Phys. Acta*, 71 Sup. 1:27–28, 1998.

Wind accretion in separated binaries. In D. T. Wickramasinghe, L. Ferrario, and G. V. Bicknell (eds.), *Accretion phenomena and related outflows, IAU Colloquium No. 163*, volume 121 of *ASP Conference Series*, 822–823, 1997.

Orbital and stellar parameters of BX Mon, with T. Dumm, D. Folini, U. Mürset, H. Nussbaumer, H. Schild, H.M Schmid, W. Schmutz, and S. Shore. In J. Mikolajewska (ed.), *Physical processes in symbiotic binaries and related objects*. Copernicus Foundation for Polish Astronomy, 1997.

HST observations of RW Hydrae, with W. Schmutz, T. Dumm, D. Folini, U. Mürset, H. Nussbaumer, H.Schild, H. M Schmid, and S. Shore. In J. Mikolajewska (ed.), *Physical processes in symbiotic binaries and related objects*. Copernicus Foundation for Polish Astronomy, 1997.

Accretion flows in ζ Aurigae, with G. Harper. In R. Pallavicini and A. K. Dupree (eds.), *Cool Stars, Stellar Systems, and the Sun, 9^{th} Cambridge Workshop*, Astronomical Society of the Pacific Conference Series, 553–554, 1996.

Colliding winds in evolved binary star systems: A 3D study of the symbiotic system EG And. In A. Harpaz and N. Soker (eds.), *Asymmetrical Planetary Nebulae*, volume 11 of the *Annals of the Israel physical society*, 248–252, 1995.

Instabilities of colliding flows and the consequences for planetary nebulae, with D. Folini. In A. Harpaz and N. Soker (eds.), *Asymmetrical Planetary Nebulae*, volume 11 of the *Annals of the Israel Phys. Soc.*, 253–257, 1995.

Instabilities in colliding winds, with D. Folini. In K.A. van der Hucht and P.M. Williams (eds.), *WR Stars: Binaries, Colliding Winds, Evolution*, *IAU Symposium No. 163*, 525–526, 1995.

X-ray emission from colliding winds in symbiotic systems, with M. Vogel. In O. Regev and G. Shaviv (eds.), *Cataclysmic variables and related physics*, volume 10 of the *Annals of the Israel Phys. Soc.*, 331, 1993.

Grid alignment effects and rotated methods for computing complex flows in astrophysics, with R.J. LeVeque. In J.B. Vos, A. Rizzi, and I.L.Ryhming (eds.), *Proceedings of the 9^{th} GAMM-conference on numerical methods in fluid mechanics*, Notes on numerical fluid mechanics, 35:376–385, 1992.

IV. Lecture Notes (in german)

- Supernovae and γ-ray Bursts: physics and numerical simulation
- From the solar wind to the accretion into a black hole: physics and numerical simulation
- Modeling of astrophysical nebulae
- Notes on the numerics and the simulation of astrophysical gas flows
- Lectures on algorithms, visualization, code-validation, and computational astrophysics
  (A-MAZE: atelier numérique, Observatoire de Paris-Meudon, 2002, and ‘École Doctorale Astronomie & Astrophysique d’Ile de France, 2001.)

V. Large audience

Visualization of unsteady radiative flows in astrophysics, with J. Favre and D. Folini. *CROSSCUTS*, Swiss Center of Scientific Computing, 6(3):7–10, 1997.

Sternentstehung und kollidierende Gasströme (star formation and colliding gas flows), with H. R. Schild. *Neue Zürcher Zeitung*, 281, 1997.